

What is claimed is:

1. A method for producing wash-free rice which does not require washing before cooking, comprising steps of:

5 preparing polished rice from brown rice polished by a built-in rice polishing machine and sifted by a built-in sifting machine and/or polished rice from outside sources;

preparing rice polishing bran (parched bran) used as an abrasive;

10 preparing a mixture consisting of said polished rice and said abrasive in a desired ratio;

stirring said mixture in a tank by revolving stirring blades such that said polished rice and said abrasive are mutually rubbed in order to strip sticking bran including skin bran and foreign debris from the surfaces of rice grains;

sifting said stirred mixture in order to separate bran from the rice grains;

15 separating residual sticking bran and foreign debris from the sifted rice grains in order to obtain finished wash-free rice; and

recovering the separated bran for recycling the bran as the abrasive.

2. The method according to claim 1, wherein:

20 in said stirring step, a revolving rate of said stirring blades is raised, if a surface level of said mixture in said tank is lower than a predetermined level either (1) at the end of the wash-free rice producing operation or (2) said mixture is not filled to capacity of said tank.

3. The method according to claim 1, wherein:

25 said sifting step is carried out in a tilted cylindrical sifting machine of which contour is formed by a mesh net such that said bran is separated from rice grains as said mixture being flowed downward by revolving said tilted cylindrical sifting machine.

4. The method according to claim 1, wherein:

30 said separating step is a step for separating foreign debris such as fine powders and the like sticking to the surface of the sifted rice grains, and

said separating step is carried out by a one or more finishing units, each

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of said finishing unit comprising:

a supply guide means for supplying rice grains uniformly;

a cylindrical rotary brushing means for brushing the surfaces of the rice grains;

5 a regulating means for smoothing a layer of supplied rice grains and regulating a holdup of the supplied rice grains, and

a combing wedge for cleaning brushes of said cylindrical rotary brushing means, wherein:

10 the rice grains are supplied uniformly in a reverse direction to a revolving direction of said cylindrical rotary brushing means as regulating the holdup and a retention time of the rice grains so that the rice grains are rubbed by said cylindrical rotary brushing means in order to strip foreign debris such as fine powders and the like sticking to the surfaces of the rice grains;

finished rice grains are taken out as wash-free rice; and

15 the separated foreign debris such as fine powders and the like are sucked and discharged by a solid-gas separating means.

5. The method according to any one of claims 1, 3 and 4, wherein:

20 ionized air from an ion generating apparatus is supplied to said sifting step and said separating step in order to eliminate static electricity so that the foreign debris such as fine powders and the like are prevented from sticking to the finished rice grains again.

6. An apparatus for producing wash-free rice which does not require washing before cooking, comprising:

25 a polished rice tank for accommodating polished rice from brown rice polished by a built-in raw rice polishing machine and sifted by a built-in sifting machine or polished rice from outside sources;

a stirring means for mixing a mixture consisting of the polished rice and an abrasive in a desired ratio by revolving stirring blades;

30 a transportation means for transporting said stirred mixture consisting of polished rice and bran;

a sifting means for sifting bran from the polished rice;

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a separating means comprising cylindrical rotary brushing means for stripping residual foreign powders such as fine powders and the like from the surfaces of rice grains in order to obtain finished wash-free rice grains; and

a separated bran recovering means for recycling the bran as the abrasive.

5 7. The apparatus according to claim 6, wherein:

said stirring means comprises:

a vertical revolving axis equipped in a vertical rotary housing:

a plurality of revolving blades arranged radially around said vertical revolving in a plurality of stages;

10 a shut-off valve arranged at the bottom of said vertical rotary housing; and

a control means for controlling a revolving rate of said revolving blades in accordance with a level of the mixture in said vertical rotary housing and for controlling a supply amount of the stirred mixture to the next step.

15 8. The apparatus according to claim 6, wherein:

said sifting means is a tilted cylindrical sifting machine of which contour is formed by a meshed net; and

one or more series of guides made of a plurality of baffle plates are arranged obliquely inside of said tilted cylindrical sifting machine so as to sift
20 the mixture as being revolved and moved downward for separating the bran from the rice grains.

9. The apparatus according to claim 6, wherein:

said separating means is a means for separating foreign debris such as fine powders and the like sticking to the surface of the sifted rice grains, and

25 said separating means is constituted by one or more separating units, each of said separating units comprising:

a supply guide means for supplying rice grains uniformly;

a cylindrical rotary brushing means for brushing the surfaces of the rice grains;

30 a regulating means for smoothing a layer of supplied rice grains and regulating a holdup of the supplied rice grains; and

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a combing wedge for cleaning brushes of said cylindrical rotary brushing means, wherein:

foreign debris such as fine powders and the like are separated from rice grains; and

5 said separated foreign debris such as fine powders and the like are sucked and discharged by a solid-gas separating means.

10. The apparatus according to claim 9, wherein:

said separating unit further comprises:

10 a downwardly tilted supply guide means constituted by a base plate and parting plates widening toward the end arranged on the base plate;

a cylindrical rotary brushing means arranged brushes on its cylindrical body below the end of said supply guide means, wherein, the brushes are revolved so as to lift falling rice grains;

15 a regulating means for smoothing a layer of the supplied rice grains and for regulating a holdup of the supplied rice grains by varying a gap between said cylindrical revolving brushing means as regulating a tilting angle of said regulating means in accordance with supplied amount of rice grains; and

a combing wedge which always cleans the brushes of said cylindrical rotary brushing means.

20 11. The apparatus according to claim 9, wherein:

said separating unit comprises:

a supply guide means;

a supply guide aiding means;

a cylindrical rotary brushing means; and

25 a combing wedge; wherein:

said supply guide means and supply guide aiding means, each constituted by a permeable net with a sifting structure, are arranged at a predetermined slanting angle;

30 a gap formed between the end of said supply guide means and the end of said cylindrical rotary brushing means is maintained such that falling rice grains are lifted by the revolving brushes of said cylindrical rotary brushing

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means;

said coming wedge always cleans the brushes of said cylindrical revolving brushing means; and

all components are designed beforehand in order to fit said all
5 components in predetermined position easily.

12. The apparatus according to any one of claims 6, 8 and 9, wherein:

a static electricity eliminating means is connected to said sifting means and separating means; and

said static electricity eliminating means comprises an ionized air
10 generating apparatus and an ionized air transporting means.

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